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# Sea cucumber hatchery and nursery production

Aquaculture Department, Southeast Asian Fisheries Development Center

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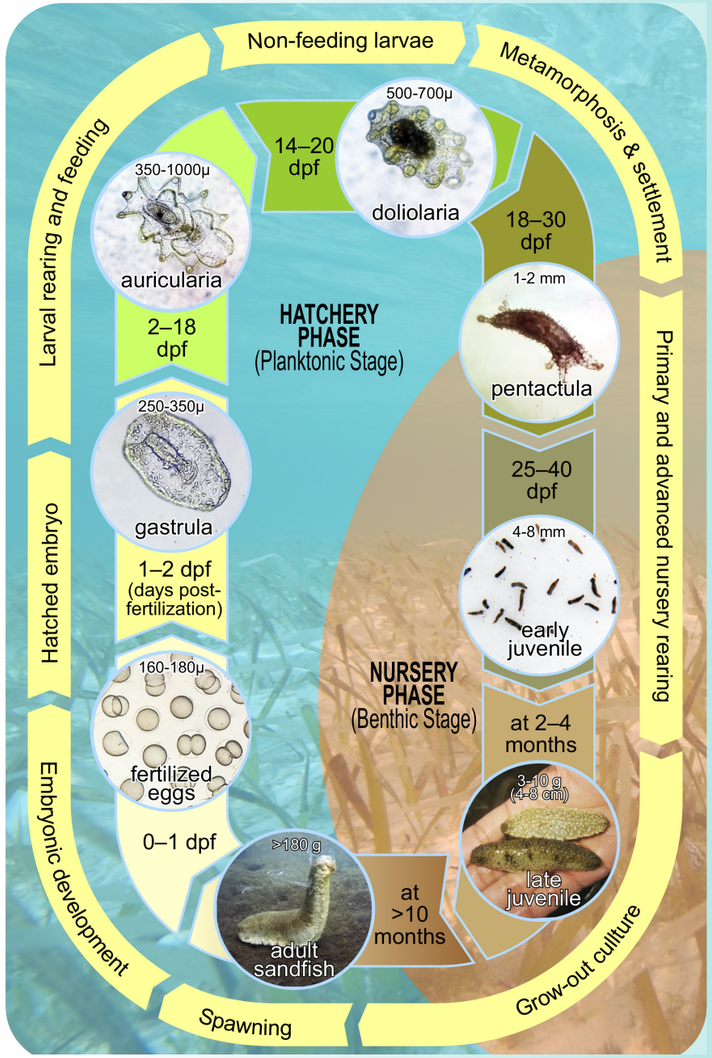
## Production Phases and Life Cycle of **SANDFISH *Holothuria scabra***




JP Altamirano and JC Rodriguez, Jr.

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**AEM 48 Seed production of sandfish (*Holothuria scabra*) in Vietnam *Nguyen Dinh Quang Duy* (2010)** An extension manual describing broodstock management, larval rearing, and management of nursery systems.

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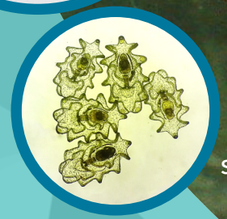
# SEA CUCUMBER

## Hatchery and Nursery Production



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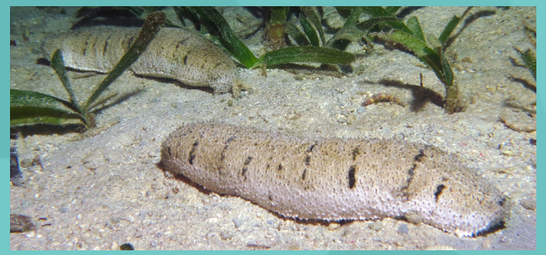
# Why culture **SEA CUCUMBER**?

Sea cucumbers are highly valued marine commodities, with prices reaching up to US$ 2,000 per kilo, when processed and dried into *trepang* or *beche-de-mer*. A great majority of traded sea cucumbers comes from wild harvest causing severe decline in stocks. Sea cucumber mariculture using hatchery-bred juveniles can offer an alternative income source especially for coastal communities, while protecting the remaining wild populations.

Expensive dried sea cucumbers for sale in Chinese markets

# What is **SANDFISH**?

Sandfish is the common English name for one particular tropical species of sea cucumber called *Holothuria scabra*. It is one of the most threatened tropical species because of its high price and ease in collection. It is typically found in shallow intertidal sandy-muddy shores, commonly associated with seagrass beds and sand flats. Sandfish has one of the highest potential for aquaculture because hatchery production technology of this species is established. SEAFDEC/AQD is one of the leading institutions developing the production technologies for sandfish.



Sandfish *Holothuria scabra* in their natural habitat

## The SEAFDEC/AQD Sea Cucumber Hatchery

The SEAFDEC/AQD maintains a small-scale sea cucumber hatchery facility for sandfish spawning, larval rearing and juvenile culture. Continuous life support systems like flow-through seawater and aeration are maintained. Natural microalgal food such as *Chaetoceros* sp. and *Naviculla* sp. are produced within the facility as well. Various experimental research are being conducted here in order to enhance sandfish production.

SEAFDEC/AQD sea cucumber hatchery, established in 2010

# How to breed **SANDFISH**?

## Broodstock conditioning

Broodstock collected from the wild are conditioned in tanks with sandy-mud substrate and flow-through seawater. They are fed with a mixture of powdered *Sargassum*, formulated feed and *Navicula* sp. slurry. After spawning, they are returned to the field where they were collected for natural recovery.

Cleaning and preparation of sandfish broodstock for spawning induction

## Spawning induction

A pre-defecated spawning group of 20-60 sexually mature sandfish are induced to spawn using non-lethal thermal and food stimulations. Males are expected to spawn first by releasing a steady stream of white milt with sperm through the gonopore – a small genital opening above the anterior or front end of the body. This may last up to 3 hours. Females spawn by releasing quick bursts of eggs after a characteristic bulging around the gonopore. Females typically perform 2-3 bursts at about 5 minutes interval. Although at SEAFDEC/AQD, we have recorded as much as 22 bursts from a single female within 1 hour.

## Larval Rearing

Fertilized eggs are stocked in tanks filled with filtered and UV-treated seawater at 100-500 eggs/L at optimum temperature (26-30°C) and salinity (28-33 ppt). Auricularia stage larvae are fed daily with *Chaetoceros calcitrans*. Water exchange (20-50%) is done every two days while siphoning out wastes from the tank bottom. At Doliolaria stage, corrugated plastic sheets painted with *Spirulina* paste are added into the rearing tank to induce settlement. Metamorphosed Pentactula are fed with *Navicula* sp. slurry.

Larval development monitoring (left) and preparation of settlement plates (right)"

## Nursery Rearing

Post-metamorphic or early juvenile sandfish (4-10 mm), at 30-45 days old, are transferred from larval tanks in the hatchery into floating hapa nets (1 m x 2 m x 1.2 m) in sea-based or tank-based nurseries. Nursery hapas are made of fine-meshed (>1 mm) net suspended with a floating PVC frame. In good sites, sandfish juveniles grow to 2-4 g within 1-2 months, depending on season and sea conditions. At this size, they are ready for advanced nursery rearing in pens or ponds.

Sandfish nursery pen in a protected cove at SEAFDEC/AQD's Igang Marine Station in Nueva Valencia, Guimaras, Philippines